

Remarks

The Applicants have amended the specification to place it into its final condition for allowance. Entry into the official file is respectfully requested.

Claims 23-30 stand rejected under 35 USC §103 over the combination of US '105 and US '688 with US '358. The Applicants note with appreciation the Examiner's detailed comments. However, the combination remains inapplicable because the Applicants have demonstrated unexpected results. Details are set forth below.

The Applicants have already demonstrated the unexpected grain refining effect resulting from the combination of Mo addition and heating temperature of induction hardening, particularly as shown in Fig. 2 of the Applicants' specification. The rejection appears to disregard this fact because the resultant (prior) austenite size overlaps with that disclosed in US '358.

The abstract of US '358 discloses that the prior (former) austenite size is not less than 8 (about 25 μm) in terms of the grain size number specified in JIS (which is similar to the grain size number (GSN) specified in ASTM E112). However, the substantially largest GSN disclosed in US '358 is 8.9 (about 18 μm). In fact 7.6 (about 29 μm), 8.2 (about 23 μm) and 8.9 are the only GSN values disclosed in US '358 at column 8, lines 23 to 26. The Applicant's remarkable drop prior grain diameter occurs within a region of a much smaller grain size. This is factually shown in the attached Reference Figure.

The Reference Figure shows grain sizes corresponding to GSN 8 to 10 are superimposed on the Applicants' Fig. 2. The GSN of larger numbers (such as 11 (about 9 μm), 12 about 6 μm), etc.) are omitted. The Reference Figure thus shows that even the grain size of Mo-Bearing steel heated at higher than 950°C or Mo-free steel is distinctly over GSN 9 (that is, grain size is distinctly smaller than 18 μm). Therefore, general teaching of GSN not less than 8 or a mere showing of a steel having GSN of 8.9, is far from teaching the unexpected grain refining effect shown in the Reference Figure.

Finally, although the Applicants note the mention of optimization, the Applicants respectfully submit that optimization no longer applies. This is because the Applicants have factually demonstrated unexpected results, namely the critical effect of the heating temperature of 950°C or less in combination with the claimed amount of Mo addition. The Examiner's

attention is again commended to the Reference Figure for that unexpected results demonstration. Withdrawal of the rejection is accordingly respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'T. Daniel Christenbury', written in a cursive style.

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